



PHYSICS

BOOKS - NTA MOCK TESTS

NEET MOCK TEST 12

Physics

1. Calculate the momentum transferred to a surface when a radiation of energy E falls

normally on it. Assume that the reflectivity of the surface is unity.

A. $\frac{E}{c}$

B. $\frac{2E}{c}$

C. Ec

D. $\frac{E}{c^2}$

Answer: B



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2. Taking the wavelength of first Balmer line in the hydrogen spectrum ($n = 3$ to $n = 2$) as 660 nm, then the wavelength of 2nd Balmer line in the same spectrum ($n = 4$ to $n = 2$) will be

A. 488.9 nm

B. 388.9 nm

C. 889.2 nm

D. 642.7 nm

Answer: A



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3. A circular hole is cut from a disc of radius 6 cm in such a way that the radius of the hole is 1 cm and the centre of 3 cm from the centre of the disc. The distance of the centre of mass of the remaining part from the centre of the original disc is

A. $\frac{3}{35}$ cm

B. $\frac{1}{35}$ cm

C. $\frac{3}{10}$ cm

D. $\frac{7}{35}$ cm

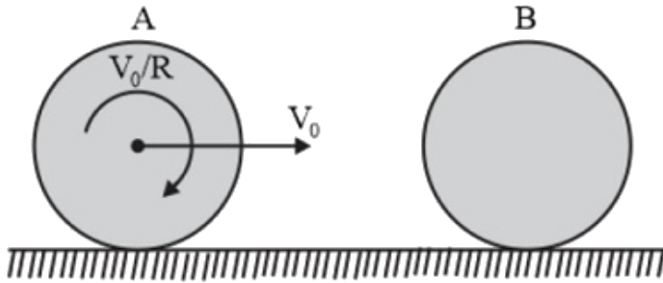
Answer: A



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4. A uniform solid sphere A of mass m is rolling without sliding on a smooth horizontal surface. It collides elastically and head - on with another stationary hollow sphere B of the same mass and radius. Assuming friction to be absent everywhere,

the ratio of the kinetic energy of B to that of A just after the collision is



- A. 5 : 2
- B. 1 : 1
- C. 2 : 3
- D. 3 : 2

Answer: A



5. The magnitude of displacement of a particle moving in a circle of radius a with constant angular speed ω varies with time t is

A. $2a \sin \omega t$

B. $2a \sin. \frac{\omega t}{2}$

C. $2a \cos \omega t$

D. $2a \cos. \frac{\omega t}{2}$

Answer: B



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6. A ideal gas ($\gamma = 1.5$) is expanded adiabatically. How many times has the gas to be expanded to reduce the root mean square velocity of molecules 2.0 times

A. 4 times

B. 16 times

C. 8 times

D. 2 times

Answer: B



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7. An electric field is applied to a semiconductor. Let the number of charge carriers be n and the average drift speed be v . If the temperature is increased,

A. both n and v will increase

B. n will increase and v will decrease

C. both n and v will decrease

D. n will decrease and will increase

Answer: B



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8. A battery is charged at a potential of 15 V for 8 h when the current flowing is 10A. The battery on discharge supplies a current of 5A for 15h . The mean terminal voltage during discharge is 14V. The watt-hour efficiency of the battery is

A. 80 %

B. 90 %

C. 87.5 %

D. 82.5 %

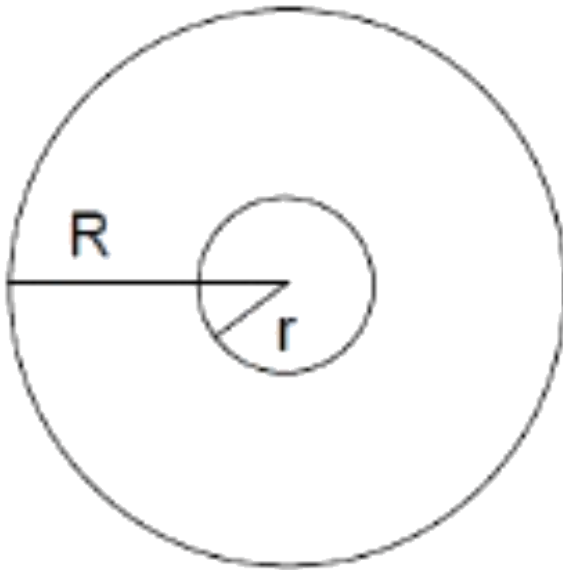
Answer: C



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9. Two concentric co - planar circular loops of radius R and r ($r < R$) are placed as shown in the figure. The mutual inductance of the

system will be



A. $\frac{\pi\mu_0 r^2}{2R}$

B. $\frac{\pi\mu_0 r^2}{4R}$

C. $\frac{\pi\mu_0 R^2}{4r}$

D. $\frac{\pi\mu_0 R^2}{2r}$

Answer: A



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10. A transformer of frequency 60 Hz and 120 V input has 8: 1 turn ratio. The frequency of the output is

A. 40 Hz

B. 480 Hz

C. 2 Hz

D. 60 Hz

Answer: D



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11. Four charges equal to $-Q$ are placed at the four corners of a square and a charge q is at its centre. If the system is in equilibrium the value of q is

A. $-\frac{Q}{4}(1 + 2\sqrt{2})$

B. $\frac{Q}{2}(1 + 2\sqrt{2})$

C. $-\frac{Q}{2}(1 + 2\sqrt{2})$

$$D. \frac{Q}{4} (1 + 2\sqrt{2})$$

Answer: D



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12. Consider two charged metallic spheres S_1 , and S_2 , of radii R_1 , and R_2 respectively. The electric fields E_1 , (on S_1 ,) and E_2 , (on S_2) the ir surfaces are such that $E_1 / E_2 = R_1 / R_2$. Then the ratio V_1 (on S_1)/ V_2 (on S_2) of the f electrostatic protentilas on ecah sphere is

A. $\left(\frac{R_1}{R_2}\right)^3$

B. $\frac{R_1}{R_2}$

C. $\left(\frac{R_2}{R_1}\right)$

D. $\left(\frac{R_1}{R_2}\right)^2$

Answer: D



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13. There is an unknown quantity

$$x = R \frac{l}{100 - l}, \text{ here } l \text{ is length (in cm)}$$

measured using a scale having least count of 1

cm and R is a quantity known accurately. Find the percentage error in measurement of x for $l = 50\text{cm}$?

A. 1 %

B. 6 %

C. 2 %

D. 4 %

Answer: D



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14. On which quantity the escape velocity for earth does not depend on

- A. mass of the earth
- B. mass of the projectile
- C. point of projection relative to the earth
- D. gravitational constant

Answer: B



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15. A simple pendulum is taken to 64 km above the earth's surface. Its new time period will

- A. increase by 1 %
- B. decrease by 1 %
- C. increase by 2 %
- D. decrease 2 %

Answer: A



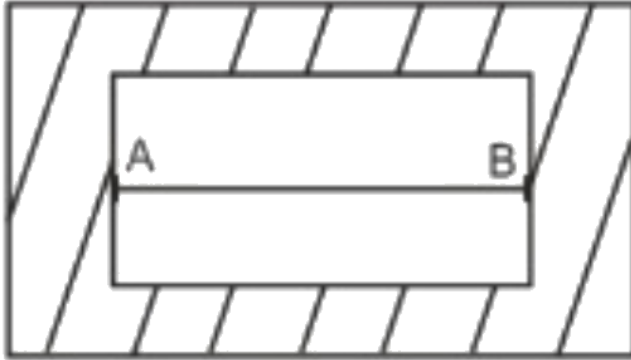
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16. An iron wire AB has diameter of 0.6 mm and length 3 m at $0^\circ C$. The wire is now stretched between the opposite walls of a brass casing at $0^\circ C$. What is the extra tension that will be set up in the wire when the temperature of the system is raised to $40^\circ C$?

Givne $\alpha_{\text{brass}} = 18 \times 10^{-6} / K$

$$\alpha_{\text{iron}} = 12 \times 10^{-6} / K$$

$$Y_{\text{iron}} = 21 \times 10^{10} \text{ N/m}^2 \quad (2)$$



A. 14.2 N

B. 13.8 N

C. 16.3 N

D. 21.7 N

Answer: A



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17. Two heat engines are operating in such a way that the heat rejected by the first engine is used as the heat input of the second. If both the engines are 40% efficient, then the overall efficiency of the system is

A. 0.64

B. 0.8

C. 0.5

D. 0.9

Answer: A



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18. The change in internal energy when 5 mole of hydrogen is heated to $20^{\circ}C$ from $10^{\circ}C$, specific heat of hydrogen at constant pressure is $8 \text{ cal/mol.}^{\circ}C$ is

A. 200 cal

B. 350 cal

C. 300 cal

D. 475 cal

Answer: C



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19. Find the amount of heat energy supplied to a Carnot engine from the source in each cycle if the engine is working between 300 K and 600 K and if has a work output of 800 J per cycle.

A. 800 J

B. 1600 J

C. 3500 J

D. 6400 J

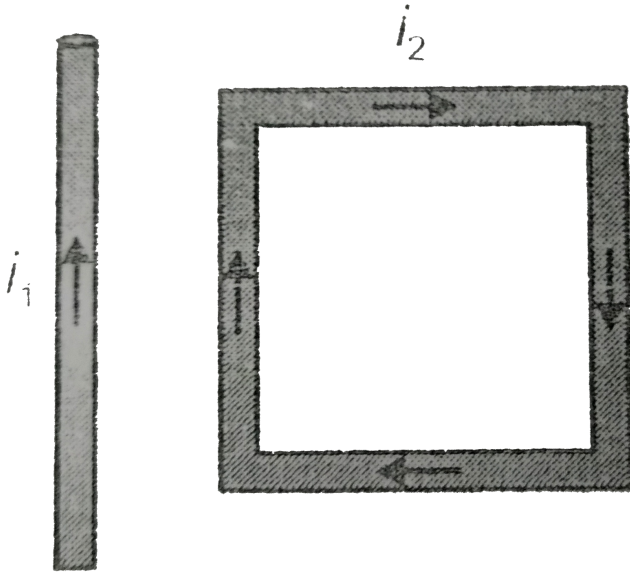
Answer: B



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20. A rectangular loop carrying a current i_2 situated near a long straight wire carrying a steady current i_1 . The wire is parallel to one of the sides of the loop and is in the plane of the

loop as shown in the figure. Then the current loop will



- A. move away from the wire
- B. move towards the wire
- C. remain stationary

D. rotate about an axis parallel to the wire

Answer: B



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21. A compass needle free to turn in a horizontal plane is placed at the centre of a circular coil of 30 turns and radius 12 cm. The coil is in a vertical plane making an angle of 45° with the magnetic meridian when the current in the coil is 0.35amp. , the needle

points west to east.

(a) Determine the horizontal component of earth's magnetic field at the location.

(b) The current in the coil is reversed and the coil is rotated about its vertical axis by an angle of 90° in the anticlockwise sense looking from above. Predict the direction of the needle. Take the magnetic declination at the places to be zero.

A. 3.9×10^{-5}

B. 3.9×10^{-6}

C. 5×10^{-5}

$$D. 2.6 \times 10^{-5}$$

Answer: A



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22. In ground to ground projectile motion under gravity, which of the following doesn't affect the time of flight ?

A. rotation of earth

B. air resistance

C. curvature of earth

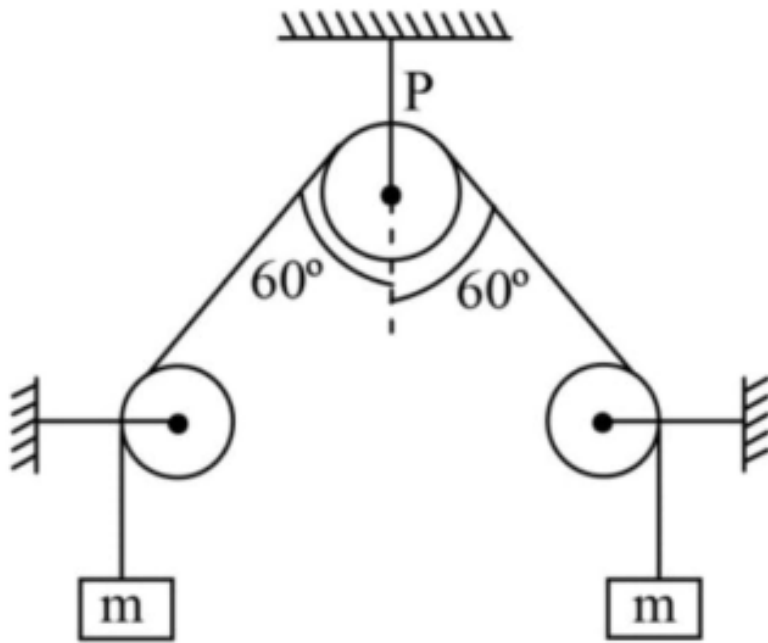
D. all of these

Answer: A



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23. The force exerted by the ideal string on the ideal pulley P shown in the figure is



A. mg

B. $2 mg$

C. $\sqrt{2}mg$

D. $4 mg$

Answer: A



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24. A boy of mass 50 kg is climbing a vertical pole at a constant speed. If coefficient of friction between his palms and the pole is 0.75, then the normal reaction between him and the pole is (take $g = 10 \text{ m/s}^2$)

A. 700 N

B. 625.67 N

C. 550 N

D. 666.67 N

Answer: D



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25. An element of mass M has Z protons and N neutrons. Masses of proton and neutron are m_p and m_n respectively. Choose the correct relation among following options.

A. $M > Zm_p + Nm_n$

B. $M = Zm_p + Nm_n$

C. $M < Zm_p + Nm_n$

D. M may be greater than, less than or equal to $Zm_p + Nm_n$ depending on natures

Answer: C



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26. The amplitude of a simple pendulum is 10 cm. When the pendulum is at a displacement of 4 cm from the mean position, the ratio of kinetic and potential energies at that point is

A. 5.25

B. 2.5

C. 4.5

D. 7.5

Answer: A



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27. For a particle executing *SHM*, the kinetic energy (K) is given by $K = K_0 \cos^2 \omega t$. The equation for its displacement is

A. $\left(\frac{k_0}{m\omega^2}\right)^{1/2} \sin \omega t$

B. $\left(\frac{2k_0}{m\omega^2}\right)^{1/2} \sin \omega t$

C. $\left(\frac{2\omega^2}{mk_0}\right)^{1/2} \sin \omega t$

D. $\left(\frac{2k_0}{m\omega}\right)^{1/2} \sin \omega t$

Answer: B



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28. Light of wavelength 3000\AA is incident on a metal surface whose work function is 1 eV. The maximum velocity of emitted photoelectron will be

A. $10ms^{-1}$

B. 10^3ms^{-1}

C. 10^4ms^{-1}

D. 10^6ms^{-1}

Answer: D



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29. When light of wavelength 300 nm or less falls on a photoelectric emitter A, photoelectrons are emitted. For another emitter B, light of wavelength 600 nm is sufficient for releasing photoelectrons. The ratio of the work function of emitter A to B is

A. 1 : 2

B. 2: 1

C. 4: 1

D. 1: 4

Answer: B



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30. Flow rate of blood through a capillary of cross - sectional are of $0.25m^2$ is $100cm^3 / s$.

The velocity of flow of blood iis

A. 1 mm/s

B. 0.2 mm/s

C. 0.3 mm/s

D. 0.4 mm/s

Answer: D



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31. The surface tension of a thin liquid film formed between a U shaped wire and a light slider of length 30 cm supporting a weight of

$1.5 \times 10^{-2} N$ is



A. $0.0125 N m^{-1}$

B. $0.1 N m^{-1}$

C. $0.05Nm^{-1}$

D. $0.025Nm^{-1}$

Answer: D



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32. A vessel contains oil (density $= 0.8gm/cm^3$) over mercury (density $= 13.6gm/cm^3$). A homogeneous sphere floats with half its volume immersed in

mercury and the other half in oil. The density of the material of the sphere in gm / cm^3 is

A. 3.3

B. 6.4

C. 7.2

D. 12.8

Answer: C



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33. If a plane glass slab is placed on letters of different colours, then red coloured letter appears to be raised minimum, why ?

A. red

B. green

C. yellow

D. violet

Answer: A



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34. Moment of inertia of a uniform circular disc about a diameter is I . Its moment of inertia about an axis perpendicular to its plane and passing through a point on its rim will be.

A. $6 I$

B. $4 I$

C. $2 I$

D. $8 I$

Answer: A



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35. A uniform disk of mass 300kg is rotating freely about a vertical axis through its centre with constant angular velocity ω . A boy of mass 30kg starts from the centre and moves along a radius to the edge of the disk. The angular velocity of the disk now is

A. $\frac{\omega_0}{6}$

B. $\frac{\omega_0}{5}$

C. $\frac{4\omega_0}{5}$

D. $\frac{5\omega_0}{6}$

Answer: D



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36. A transistor is used as a common emitter amplifier with a load resistance of $2k\Omega$. The input resistance is 150Ω . Base current is changed by $20\mu A$ which results in change in collector current by 1.5 mA . The voltage gain of the amplifier is

A. 900

B. 1000

C. 1100

D. 1200

Answer: B



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37. When LED is forward biased, then

- A. electrons from the n - type side cross the p - n junction and recombine with holes in the p - type side
- B. electrons and holes neutralise each other in depletion region
- C. at junction electrons and holes remain at rest
- D. none of these

Answer: A



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38. At what temperature, the kinetic energy of a gas molecule is half of the value at $27^{\circ}C$. ?

A. $13.5^{\circ}C$

B. $150^{\circ}C$

C. 75 K

D. $-123^{\circ}C$

Answer: D



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39. The volume of a metal sphere increases by 0.24% when its temperature is raised by $40^\circ C$. The coefficient of linear expansion of the metal is $^\circ C$

A. 2×10^{-5}

B. 6×10^{-5}

C. 2.1×10^{-5}

D. 1.2×10^{-5}

Answer: A



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40. The dimensions of $\frac{a}{b}$ in the equation $P = \frac{a - t^2}{bx}$ where P is pressure, x is distance and t is time are

A. ML^1T^{-1}

B. M^2LT^{-1}

C. ML^0T^{-2}

D. M^0L^{-1}

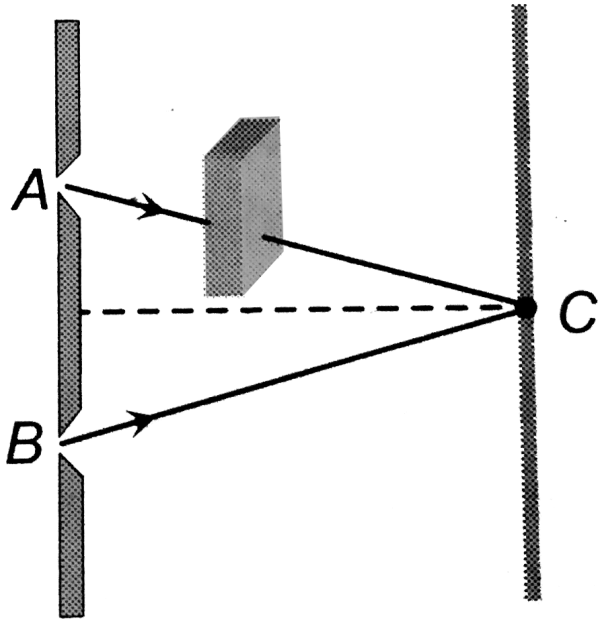
Answer: C



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41. In Young's experiment, monochromatic light is used to illuminate the two slits A and B. Interference fringes are observed on a screen placed in front of the slits. Now if a thin glass plate is placed normally in the path of

the beam coming from the slit



- A. fringes will disappear
- B. fringe width will increase
- C. fringe width will increase

D. there will be no change in the fringe width but fringe pattern will shift

Answer: D



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42. An electromagnetic wave propagating along north has its electric field vector upwards. Its magnetic field vector point towards

A. $\vec{E} = E_0 \hat{i}, \vec{B} = B_0 \hat{j}$

B. $\vec{E} = E_0 \hat{j}, \vec{B} = B_0 \hat{i}$

C. $\vec{E} = E_0 \hat{j}, \vec{B} = B_0 \hat{i}$

D. $\vec{E} = E_0 \hat{j}, \vec{B} = B_0 \hat{k}$

Answer: A



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43. A wave of frequency 500 Hz has velocity 360 m/sec. The distance between two nearest points 60° out of phase, is

A. 70 cm

B. 0.7 m

C. 12.0 cm

D. 120.0 cm

Answer: C



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44. A wave is represented by the equation

$$y = 7 \sin\left(7\pi t - 0.04\pi x + \frac{\pi}{3}\right)$$

x is in metres and t is in seconds. The speed of the wave is

A. 175 m/s

B. $49\pi \text{ m/s}$

C. $49 / \pi \text{ m/s}$

D. $0.28\pi \text{ m/s}$

Answer: A



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45. Work down by static friction on an object :

A. may be positive

B. must be negative

C. must be zero

D. none of these

Answer: A



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